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and Space Administration**

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Announcement of Opportunity

Explorer Program

Medium-class Explorers (MIDEX) and Missions of Opportunity

**Notice of Intent Due:
Proposals Due:**

**June 25, 1998
August 21, 1998**

MEDIUM-CLASS EXPLORER AND MISSIONS OF OPPORTUNITY ANNOUNCEMENT OF OPPORTUNITY

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FOREWORD

This document is an Explorer program Announcement of Opportunity (AO) for two different types of investigations; Medium-class Explorers (MIDEX) and Missions of Opportunity.

Section 1, Description of Opportunity, provides a brief introduction describing the scope of the solicitation, the two types of investigations that may be proposed in response to this AO, a summary of the selection process, and the schedule. Section 2, Explorer Program Goals, Objectives, and Background, and Section 3, Explorer Program Constraints, Guidelines, and Requirements, are applicable to both MIDEX investigations and Missions of Opportunity investigations. Section 4 describes MIDEX investigations and MIDEX-specific requirements. Section 5 describes Missions of Opportunity investigations and Missions of Opportunity-specific requirements. Section 6, Proposal Preparation and Submission, Section 7, Proposal Evaluation, Selection, and Implementation, and Section 8, Conclusion, are applicable to both MIDEX investigations and Missions of Opportunity investigations.

Proposers interested only in MIDEX investigations should read sections 1, 2, 3, 4, 6, 7, and 8 and any Appendices referred to in those sections.

Proposers interested only in Missions of Opportunity should read sections 1, 2, 3, 5, 6, 7, and 8 and any Appendices referred to in those sections.

1.0 DESCRIPTION OF OPPORTUNITY

1.1 General Provisions

The National Aeronautics and Space Administration (NASA), Office of Space Science announces the opportunity to conduct space science investigations through the Explorer program. For the purposes of this announcement, the term “space science” encompasses the Office of Space Science scientific objectives of the following NASA science themes:

Astronomical Search for Origins;
Structure and Evolution of the Universe; and
the Sun-Earth Connection.

Additional information concerning these themes is provided in Section 2.1 and through appropriate links found on the Office of Space Science homepage at the World Wide Web address [<http://www.hq.nasa.gov/office/oss/>](http://www.hq.nasa.gov/office/oss/).

Proposals submitted in response to this Announcement of Opportunity (AO) must be for complete investigations encompassing all appropriate mission phases. For the purposes of this AO, mission phases are defined as follows: Phase A - concept study; Phase B - definition and preliminary design; Phase C - detailed design; Phase D - development (through launch plus 30 days); and Phase E - mission operations and data analysis. Phase E is to include analysis and publication of data in the peer reviewed scientific literature and delivery of the data to an appropriate NASA data archive.

This AO invites proposals for the third and fourth Medium-class Explorer (MIDEX) missions and for participation in non-NASA space missions, identified in this announcement as Missions of Opportunity. MIDEX investigations are complete missions launched on expendable launch vehicles or the Space Shuttle. Further description of MIDEX investigations is given in Section 4.0. Depending on the availability of proposals of appropriate merit, NASA intends to select two MIDEX missions, one to launch by June 2003, and one to launch by June 2004.

Participation in Missions of Opportunity may be undertaken through the Explorer program when the perceived value is high and the proposed cost to NASA is within the funding limits of the Explorer program. NASA is not required to select a Mission of Opportunity under this solicitation. The Explorer program also expects Missions of Opportunity to meet other program objectives for reducing cost, injecting new technology, and enhancing education and public outreach. Note that if a Mission of Opportunity is selected, a reduced flight rate of other Explorers is expected. Further information on Missions of Opportunity is given in Section 5.0.

1.2 Proposal Evaluation and Selection Process

The selection process will be done in two phases. In phase 1, proposals will be assessed against criteria given in Section 7.2 by panels of individuals who are peers of the proposers in the relevant scientific and technical areas. Proposals will be categorized in accordance with the NASA Federal Acquisition Regulation Supplement (NFS) Part 1872.0. The results of the proposal evaluations and categorizations will be reviewed by the Space Science Steering Committee that will conduct an independent assessment of the evaluation and categorization processes. After this review, the final evaluation and categorization results and the total proposed cost will be presented to the Associate Administrator for Space Science, who will make the selections for a four-month Phase A concept study. It is anticipated that up to four MIDEX missions will be selected for concept studies. NASA may also select investigations that will be awarded contracts to conduct concept studies for Missions of Opportunity. Each MIDEX Phase A study will be funded up to \$350K in real year dollars.

For phase 2, NASA will conduct a detailed review of the Phase A concept study results to evaluate the implementing details of the selected investigations, namely, any modifications of the scientific objectives, the proposed cost to NASA, design details of the investigation hardware, plans for mission

implementation including all technical and management factors, details of the education and public outreach programs, and plans for any new technology. As a result of this second evaluation, NASA intends to select two MIDEX investigations, and possibly Missions of Opportunity, for implementation leading to flight. Sections 7.1, 7.2, and 7.3 provide additional details on these activities.

1.3 Proposal Opportunity Period and Schedule

NASA is seeking MIDEX investigations with mission launch dates no later than June 2003 and June 2004. Investigations with anticipated launch dates later than these should be proposed in response to a subsequent MIDEX AO.

NASA is seeking Missions of Opportunity through this AO where a commitment from NASA is needed by the sponsoring organization before December 31, 1999. The launch dates may be at any time. Missions of Opportunity requiring later commitment dates should propose in response to a subsequent Explorer program AO. The following schedule describes the major milestones for this MIDEX and Missions of Opportunity AO.

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|--|--------------------|
| AO release..... | March 25, 1998 |
| Preproposal Conference..... | May 20, 1998 |
| Notice of intent due..... | June 25, 1998 |
| Proposal submittal due by 4 pm EDT..... | August 21, 1998 |
| Non-U.S. Letter(s) of Endorsement due..... | September 22, 1998 |
| Selections for Phase A concept study (target)..... | December 1998 |
| Contract award (target)..... | January 1999 |
| Selections for flight (target)..... | June 1999 |

2.0 EXPLORER PROGRAM GOALS, OBJECTIVES, AND BACKGROUND

2.1 Space Science Research Goals

The scientific goals of space science research within the Office of Space Science (OSS) are generally contained in *The Space Science Enterprise Strategic Plan: Origins, Evolution, and Destiny of the Cosmos and Life* (November 1997). See Appendix D for access information for this and related documents describing OSS scientific goals.

The goals and strategies outlined in these documents encompass a wide range of scientific questions spanning a variety of scientific disciplines that NASA seeks to address by supporting investigations in three broad categories: (1) laboratory research and theoretical analyses; (2) ground-based astronomical observations; and (3) flight projects. This AO solicits only those investigations that fall into this third category. The scientific goals in these referenced documents as they relate to the NASA science themes listed in Section 1.1 will form the basis of the science evaluation criteria. Further information on the science themes may be obtained through appropriate links found on the Office of Space Science homepage at the World Wide Web address <<http://www.hq.nasa.gov/office/oss/>>.

2.2 Explorer Program Objectives

Explorers are space physics and astronomy missions intended to study the Sun, to examine the space environment of the Earth and other planets, and to observe the universe beyond our Solar System.

The Explorer program seeks to conduct scientific investigations of modest programmatic scope. The program intends to provide a continuing opportunity for quickly implemented flights of missions to conduct focused investigations that complement major flight missions, prove new scientific concepts, or make other significant contributions to space science.

The Explorer program is designed to accomplish frequent, high quality space science investigations utilizing innovative, streamlined, and efficient management approaches. It seeks to reduce cost and improve performance by selecting investigations for which investigators will commit to cost limits, control business and technical processes, and apply new technology. Finally, it seeks to enhance public awareness of, and appreciation for, space science and to incorporate educational and public outreach activities as integral parts of space science investigations.

2.3 Program Background

The Explorer program provides several classes of flight opportunities for the science themes described in Section 1.1. Recent changes to the Explorer program have been designed to increase the number of flight opportunities in response to recommendations from the scientific community. These changes include providing new classes of Explorer missions and opening up additional opportunities within each class. Explorer program classes are characterized by the scope of the mission, based primarily on cost and secondarily on payload size and launch vehicle capabilities. The current Explorer program classes are as follows:

- University-class Explorers (UNEX) are investigations characterized by a definition, development, launch service, and mission operations and data analysis costs not to exceed \$13 million (in Fiscal Year 1998 dollars) total cost to NASA. University-class Explorer missions will be launched by a variety of low cost methods. Initially, one launch per year is anticipated. A long term program goal is to achieve multiple launches per year for this class of Explorer missions with a substantially lower cost per mission.
- Small Explorers (SMEX) are investigations characterized by a definition, development, launch service, and mission operations and data analysis costs not to exceed \$71 million (in Fiscal Year 1998 dollars) total cost to NASA. It is NASA's intent to launch one Small Explorer mission per year.
- Medium-class Explorers (MIDEX) are investigations characterized by a definition, development, launch service, and mission operations and data analysis costs not to exceed \$140 million (in Fiscal Year 1998 dollars) total cost to NASA. NASA intends to launch one MIDEX mission per year.
- Missions of Opportunity are investigations characterized by being part of a non-NASA space mission of any size, but having a NASA cost that is typically under \$21 million (in Fiscal Year 1998 dollars) total cost to NASA. These missions are conducted on a no-exchange-of-funds basis with the organization sponsoring the mission. NASA intends to solicit proposals for Missions of Opportunity with each future AO issued for UNEX, SMEX, and MIDEX investigations. For each AO, the cost limit for Missions of Opportunity is expected to be constant, adjusted only for inflation.

3.0 EXPLORER PROGRAM CONSTRAINTS, GUIDELINES, AND REQUIREMENTS

This section describes the constraints, guidelines, and requirements applicable to all Explorer program selections. Additional constraints specific to MIDEX are in Section 4, and constraints specific to Missions of Opportunity are in Section 5. Specific directions for proposal preparation are included in Section 6.

3.1 General Program Constraints and Guidelines

The strategic role of the Explorer program is to address Space Science Enterprise science goals and objectives that are within the scope of the Explorer program and not addressed by missions explicitly included in the Space Science Enterprise Strategic Plan (see Appendix D). Explorer missions that are intended to achieve science goals of missions already in the Strategic Plan for a similar time period (proposed for launch by mid 2004) may not be proposed for consideration by this AO. Specifically,

missions with science goals similar to those for the Solar-B and STEREO missions should not be proposed.

The major responsibility for implementing a selected investigation rests with the investigation team, which will have a large degree of freedom with which to accomplish its proposed objectives with only essential NASA oversight. In accordance with NASA's transfer of program management responsibility to its Centers, the NASA Goddard Space Flight Center (GSFC) has been assigned program management responsibility for Explorers. In this role, which is separate from their role as a possible partner in the investigation, GSFC is responsible for NASA's fiduciary responsibility to ensure that Explorer missions are achieved in compliance with committed cost, schedule, performance, reliability, and safety requirements. The level of GSFC's involvement in this role may vary from mission to mission, depending on the implementing organization and other programmatic considerations. It is expected that the GSFC Explorer Program Office will work with the Principal Investigator and implementing organization to define roles and responsibilities to fulfill this responsibility in the most effective manner. (See Appendix D for an example Mission Definition and Requirements Agreement.)

Once an investigation has been selected for flight, failure to maintain reasonable progress on an agreed upon schedule or failure to operate within the constraints outlined below may be cause for its termination by NASA. Every aspect of a selected investigation must reflect a commitment to mission success while keeping total costs as low as possible. Consequently, investigations should be designed and planned to emphasize mission success within cost and schedule constraints by incorporating sufficient margins, reserves, and content resiliency. Only those investigations whose proposed cost, schedule, and launch vehicle requirements do not exceed the constraints and guidelines identified herein will be considered as candidates for selection.

3.2 Science Requirements

The relationship between the proposed scientific objectives, the data to be returned, and the instrument payload to be used in carrying out the proposed investigation must be unambiguous and clearly stated in the proposal. Explorer investigation teams will be responsible for initial analysis of the data, their subsequent delivery to an appropriate data repository, the publication of scientific findings, and communication of the results to the public.

In accordance with NASA policy, data are to be released as soon as possible after a brief validation period appropriate for the mission. Explorer teams will be responsible for collecting the scientific, engineering, and ancillary information necessary to validate and calibrate the scientific data prior to depositing it in the appropriate data repository. The time required to complete this process should be the minimum necessary to provide appropriate data to the scientific community and the general public and must be described in the proposal. As part of their funded Phase E activities, investigation teams must include an appropriate period for data analysis independent of archiving activities.

3.3 Education, Outreach, New Technology, Small Disadvantaged Business Requirements, and Minority Institution Requirements

3.3.1 Education and Outreach

The NASA Office of Space Science (OSS) has developed a comprehensive approach for making education at all levels (with a particular emphasis on pre-college education) and the enhancement of public understanding of space science integral parts of all of its missions and research programs. The two key documents that establish the basic policies and guide all OSS Education and Outreach activities are a strategic plan entitled *Partners in Education: A Strategy for Integrating Education and Public Outreach Into NASA's Space Science Programs* (March 1995), and an accompanying implementation plan entitled *Implementing the Office of Space Science (OSS) Education/Public Outreach Strategy* (October 1996). Both are available through the Explorer Program Library (see Section 6.1.1 and Appendix D) or, alternatively, can be accessed by selecting "Education and Public Outreach" from the menu on the OSS homepage at the World Wide Web address

<<http://www.hq.nasa.gov/office/oss/>>, or may be requested from Dr. Jeffrey Rosendhal, Office of Space Science, Code S, NASA Headquarters, Washington, DC 20546-0001.

In accord with these established OSS policies, all respondents to this AO must include an Education/Public Outreach (E/PO) component as part of their overall proposal. In accord with the policies outlined in the education implementation plan referred to above, up to 2% of the total mission budget over the period of performance of the proposal is anticipated to be allocated to education and outreach. OSS expects that a substantive education/outreach program will be an integral element of every selected mission and that adequate resources will be devoted by proposers to the planning and implementation of such an effort. Proposed activities may also include public information programs that will inform the public through mass media or other means, or utilize other innovative ideas for bringing space science to the public. Proposals must include the PI's approach for planning an education/outreach program, arranging for appropriate partners and alliances, implementing the education/outreach program (including appropriate evaluation activities), and planning for the dissemination of education/outreach products and materials. Costs for such activities must be included as a part of mission planning, development, and operations costs.

See Appendix C for a detailed discussion of evaluation criteria for E/PO proposals. Appendix C also provides information on the assistance available to develop E/PO proposals.

3.3.2 Advanced Technology

NASA seeks to infuse new technologies that enhance performance and reduce costs into its programs and to strengthen the mechanisms by which it transfers such technologies to the private sector, including the nonaerospace sector. The means by which NASA's Office of Space Science plans to implement new technology is described in the *Office of Space Science Integrated Technology Strategy*, which is included in the Explorer Program Library (see Appendix D). Explorer investigations present an opportunity to develop and test new technologies and applications. Investigations dependent on new technology will not be penalized for risk provided that adequate plans are described to provide a reasonable back-up approach that will assure the success of the investigation.

3.3.3 Small Disadvantaged Businesses and Minority Institutions

The Principal Investigator (PI) and team members shall agree to use their best efforts to assist NASA in achieving its goal for the participation of small disadvantaged businesses, women-owned small businesses, Historically Black Colleges and Universities, and other Minority Educational Institutions in NASA procurements. Investment in these organizations reflects NASA's commitment to increase the participation of minority concerns in the aerospace community, and is to be viewed as an investment in our future. Offerors, other than small business concerns, are also advised that contracts resulting from this AO will be required to contain a subcontracting plan that includes goals for subcontracting with small, small disadvantaged, and women-owned small business concerns. (See Appendix A, Section XIII.)

3.4 Technical Approach Requirements

Proposals must encompass all technical aspects of the investigation from the initial studies through delivery of the data to the appropriate data repository and their analysis (the final part of the operations phase, Phase E). NASA Handbook NHB 7120.5, *Management of Major System Programs and Projects*, delineates activities, milestones, and products typically associated with each of these phases and may be used as a reference in defining a team's mission approach. This Handbook is included in the Explorer Program Library (see Appendix D). Mission teams have the freedom to use their own processes, procedures, and methods, and the use of innovative processes is encouraged when cost, schedule, technical improvements, and reliability can be demonstrated. Mission teams shall abide by all necessary Federal (including NASA), state, and local laws and regulations.

Selected investigations shall have a product assurance program that is consistent with the requirements of the ISO 9000 series, American National Standard, *Quality Systems - Model for Quality Assurance in Design, Development, Production, Installation, and Servicing*, ANSI/ASQC Q9001-1994. The investigation's product assurance program must meet the requirements in the MIDEX Safety, Reliability, and Quality Assurance Requirements document that is available in the Explorer Program Library.

Investigation teams may use non-NASA or NASA navigation, tracking, control, communications, and other services. For Explorer proposals, however, costs for such services, whether obtained from NASA or from other sources, *must* be included in the cost estimate. Information on space communications capabilities and costing is given in the appropriate Ground Data Systems and Mission Operations and Data Analysis document available in the Explorer Program Library.

3.5 Management Requirements

Explorer mission investigation teams must be led by a single Principal Investigator (PI) who may be from any category of U.S. or non-U.S. organization, including educational institutions; industry or nonprofit institutions; or from one of the NASA Centers, the Jet Propulsion Laboratory (JPL), other Federally-funded research and development centers, or other U. S. Government agencies. Teams may be formed from any combination of these institutions.

NASA intends to allow the Principal Investigator and his/her team to use their own management processes, procedures, and methods to the fullest extent possible. Investigation teams should define the management approach best suited for their particular teaming arrangement. This approach should be commensurate with the investigation's implementation approach, while retaining a simple and effective management structure necessary to assure the adequate control of development within the cost and schedule constraints. The investigation team should develop a Work Breakdown Structure (WBS) that best fits its organizational approach and mission design concept.

The PI is expected to be in charge of each investigation, with full responsibility for its scientific integrity. The PI is responsible for assembling a team to propose and implement the investigation. Proposers may obtain services from any source. Note that the level of detail required in the proposal is the same no matter what organizations are part of the investigation team, even a NASA center. The PI is accountable to NASA for the scientific success of the investigation. Therefore, the PI must be prepared to recommend mission termination if, in his/her judgment, the successful achievement of established science objectives, as defined in the proposal, is no longer likely within the committed cost and schedule reserves.

Each investigation must define the risk management approach it intends to use to ensure successful achievement of the mission objectives within established resource and schedule constraints. Included in this discussion of risk management should be risk mitigation plans for any new technologies and the need for any long-lead items that need to be placed on a contract before the start of the development phase, to ensure timely delivery. In addition, any manufacturing, test, or other facilities needed to ensure successful completion of the proposed investigation should be identified.

Each selected investigation must have a Project Manager (PM) who will oversee the technical implementation of the investigation. The role, qualifications, and experience of the PM should be adequate to ensure that the technical and managerial needs of the investigation will be met.

3.6 Cost Requirements

3.6.1 Full Cost Accounting

Where NASA provided services are used, NASA Civil Service labor and supporting NASA Center infrastructure must be costed on a full cost accounting basis. If NASA guidance for full cost accounting has not been fully developed by the closing date for proposal submission or for completion of the concept study, NASA Centers may submit full cost proposals based on the

instructions in the NASA Financial Management Manual, Section 9091-5, Cost Principles for Reimbursable Agreements, or based on their own Center-approved full cost accounting models. Other Federal Government elements of proposals must follow their agency cost accounting standards for full cost. If no standards are in effect, the proposers must then follow the Managerial Cost Accounting Standards for the Federal Government as recommended by the Federal Accounting Standards Advisory Board.

3.6.2 Goods and/or Services Offered on a No Exchange of Funds Basis

Contributions of any kind, whether cash or noncash (property and services), to Explorer investigations by organizations other than the Office of Space Science are welcome. Values for all contributions of property and services shall be established in accordance with applicable cost principles. Such contributions may be applied to any part or parts of a mission. A letter of endorsement that contains a statement of financial commitment from each responsible organization offering to make a contribution to the investigation must be submitted with the proposals for all U.S. components. For non-U.S. components of proposals, see Section 3.7.

The cost of contributed hardware or software should be estimated as either: (1) the cost associated with the development and production of the item if this is the first time the item has been developed and if the mission represents the primary application for which the item was developed; or (2) the cost associated with the reproduction and modification of the item (i.e., any recurring and mission-unique costs) if this is not a first-time development. If an item is being developed primarily for an application other than the one in which it will be used in the proposed investigation, then it may be considered as falling into the second category (with the estimated cost calculated as that associated with the reproduction and modification alone).

The cost of contributed labor and services should be consistent with rates paid for similar work in the offeror's organization. The cost of contributions does not need to include funding spent before the start of the investigation (before completing a contract, grant, or cooperative agreement with NASA). The value of materials and supplies shall be reasonable and shall not exceed the fair market value of the property at the time of the contribution.

3.6.3 NASA Cost

The NASA Cost is the funding that NASA would be expected to provide to the investigation team over the course of the investigation, beginning with selection and ending with the conclusion of Phase E. Examples of costs to be included are launch services including any upper stages; education and outreach activities; new technology; subcontracting costs (including fees); science teams; all personnel required to conduct the investigation, analyze and publish results, and deliver data in archival format; insurance; ground data system; labor (contractor); NASA civil servant costs; reserves; and contract fees. The specific total funding limits and limits for major mission elements are specified in Sections 4 and 5. The NASA Cost is a consideration in the selection of investigations and in the continuing assessment of ongoing missions.

3.7 International Participation

Recognizing the potential scientific, technical, and financial benefits offered to all partners by international cooperation, participation by non-U.S. individuals and organizations as team members in Explorer investigations is welcomed. Participation may include, but is not limited to, the contribution of scientific instruments, the spacecraft (or a portion thereof), and the subsequent sharing of the data from the mission, all on a no-exchange-of-funds basis. Carriers, launch vehicles and launch services, and space operations may also be contributed by international partners and must be included in all calculations and discussions of the Total Mission Costs (see Section 4.4.2).

The direct purchase of goods and/or services from non-U.S. sources is permitted except that NASA is precluded from purchasing non-U.S. launch vehicles, nor may funds provided to a mission team be used to purchase a launch vehicle from a non-U.S. source. The provision of launch services as a

contribution to an Explorer mission by a non-U.S. partner is acceptable only on a no-exchange-of-funds basis (i.e., at no cost to NASA). Only those non-U.S. launch vehicles with demonstrated reliabilities may be proposed for Explorer missions.

Proposers are advised that a contract or subcontract by a U.S. team with a non-U.S. participant using funds derived from NASA must meet NASA and Federal regulations. Proposers are further advised that these regulations will place an additional burden on investigation teams that should be explicitly included in discussions of the investigation's cost, schedule, and risk management. Information regarding regulations governing the procurement of foreign goods or services is provided in Appendix E.

Proposers for non-NASA, non-U.S. missions should recognize that all such proposals must be consistent, and in compliance with, all U.S. Government laws, regulations, and policies governing the export of hardware and/or technical data. Further, any such successful proposal will require the appropriate agreement(s) and export license(s). Therefore, all proposers for non-U.S. missions should contact the Space Science and Aeronautics Division, Office of External Relations, at NASA Headquarters at the address in Section 6.3.1 during the preparation of the concept study to obtain information about U.S. Government laws or policies (e.g., export control), as well as NASA policy and procedures regulating international cooperation that may be relevant to the proposal.

Participation by non-U.S. individuals and/or institutions as team members or contributors to Explorer investigations must be endorsed by the institutions and/or governments involved. If government support is required, then a government endorsement is also needed. The letter of endorsement must provide evidence that the non-U.S. institution and/or government officials are aware and supportive of the proposed investigation and will pursue funding for the investigation if selected by NASA. Such endorsements must be submitted per the schedule in Section 1.3.

4.0 MIDEX OPTIONS, GUIDELINES, AND REQUIREMENTS

MIDEX proposals must be for complete, free-flying missions. The Principal Investigator (PI) is responsible to NASA not only for the scientific integrity of the investigation, but also for the management of the complete mission, including provision of the spacecraft, instrument, and ground system. Such missions may be launched on expendable launch vehicles or the Space Shuttle as free flying spacecraft.

4.1 MIDEX Options

Expendable Launch Vehicle Option

Proposals are for complete missions that are launched using expendable launch vehicles (ELV's) either as primary, secondary, or co-manifested payloads. Some of the ELV launch options that are available and may be proposed include launch services on a Small Expendable Launch Vehicle (SELV), a Medium-Lite Expendable Launch Vehicle (Med-Lite), and either a Delta II, or Atlas-Centaur (IIA or IIS) on commercial missions. NASA seeks to take advantage of all reasonable sources of commercial ELV services while assuring that NASA-funded payloads are not exposed to excessive risk. The demonstrated reliability of the proposed launch vehicle and the resultant probability of mission success will be evaluated by NASA and factored into the feasibility of mission implementation evaluation criteria (see Section 7.2). Information on the reliability of ELV's may be obtained from the point of contact listed in the Expendable Launch Vehicle Opportunities document in the Explorer Program Library (Appendix D). If the opportunity is as a secondary payload on an ELV, the proposer must identify the secondary opportunity and provide evidence that the launch service provider agrees to manifest the investigation as part of the proposal. If the investigation is selected, NASA expects to contract with the U.S. launch service provider to acquire the launch service for the investigation.

It is the responsibility of the proposer to find an organization that will contribute a launch if a contributed launch is part of the proposal. The demonstrated reliability and the resultant probability of mission success will be evaluated as described above for both contributed launch services and NASA funded launch services. The use of non-U.S. provided launch services may be proposed only on a no-exchange-of-funds basis.

Space Shuttle Free Flyer Option

Use of the Space Shuttle may be proposed only if its unique capabilities will result in enhanced science return or are necessary for mission success. The request for a Shuttle launch must demonstrate compliance with the Space Shuttle Use Policy set forth in Public Law 101-611 (see the Shuttle Launch Opportunities document in the Explorer Program Library (Appendix D)). The PI is responsible for working with the point(s) of contact identified in the Shuttle Launch Opportunities document to determine if the investigation is considered a primary or secondary payload and to identify an appropriate flight assignment.

4.2 Baseline and Minimum Science Missions

MIDEX missions proposed in response to this AO should have both a Baseline Mission and a Minimum Science Mission. The Baseline Mission refers to that mission that, if fully implemented, will accomplish the entire set of scientific objectives identified for the mission at the initiation of the definition phase. Any alteration of the mission that results in a reduction of the mission's ability to accomplish the Baseline Mission set of scientific objectives as identified at the beginning of definition will be considered a "descoping" of the mission. The resulting set of achievable scientific objectives must be reviewed to ensure that the mission remains at or above the Minimum Science Mission. The differences between the Baseline Mission and the Minimum Science Mission will be assessed in order to determine the mission's resiliency in the event that development problems lead to reductions in scope.

The Minimum Science Mission is the minimum science component below which the investigation will not be considered justifiable for the proposed cost. The Minimum Science Mission must be identified and documented in the AO response. A plan for the prioritized descoping of mission capability from the Baseline Mission to the Minimum Science Mission in the event of cost or schedule growth shall be developed during the definition phase. In addition, the mission team will negotiate a set of performance metrics during the definition phase for program evaluation, including cost, schedule, and others as appropriate. Failure to maintain a level of science return at or above the Minimum Science Mission or violation of the agreed upon metrics will result in the mission being reviewed for possible termination.

4.3 International Participation

Any proposed international participation must be described at the same level of detail as that of U.S. partners. This includes the provision of cost, schedule, and management data in the proposal and in subsequent reviews. Failure to document cost and schedule data, management approaches and techniques, or failure to document the commitment of all team partners to those costs and schedules, may cause a proposal to be found unacceptable.

4.4 Cost and Schedule Requirements

The MIDEX program is part of an effort to develop frequent space science investigations of modest scope. The schedule for investigations selected through this AO is expected to be such that launch can take place by June 2003 for the first mission and June 2004 for the second mission. The proposer must specify the launch date in the proposal. It may be necessary for NASA to adjust the launch dates of the selected missions from those proposed to conform to the available Explorer program budget profile; therefore, launch date flexibility should also be indicated in the proposal. Procurement of long lead materials is permitted during the Phase B/C time frame but should be defined early in the concept study. No time constraint is placed on Phase E.

4.4.1 NASA Cost

For a MIDEX, NASA cost is limited to \$140 million in fiscal year 1998 dollars, including funding for all phases and all elements (launch services, Phase A through Phase E, mission operations and data analysis). The proposer may distribute the funds among these elements as best suits the investigation.

Although NASA plans to fund directly the costs for U.S. launch services, these costs are nonetheless to be included in the proposal. Launch services may also be proposed at no cost to NASA as part of a teaming proposal.

The ELV launch services cost to be used to calculate the NASA Cost for an investigation using an ELV is provided in the MIDEX ELV Launch Opportunities document available in the Explorer Program Library.

If launch services using the Space Shuttle are proposed, the launch services costs include mission unique costs and integration costs. The cost of completing development of a GSFC-provided carrier, if such a carrier will be used for the first time, should be included under spacecraft cost.

The specific cost information required for MIDEX proposals is contained in Appendix B, Table B-1.

4.4.2. Total Mission Cost

The Total Mission Cost is defined as all costs that are necessary to complete an investigation beginning with selection through Phase E, including NASA costs, non-NASA Civil Servant costs, and contributions from U.S. and non-U.S. entities. In general, proposers should assume all costs must be included unless specifically excluded.

Contributions, that is, goods and/or services offered on a no-exchange-of-funds basis, may be to any mission element but the total contribution is not to exceed one-third of the total proposed NASA cost.

Proposers must estimate the Total Mission Cost in the proposal as described in Appendix B, Table B1. The Total Mission Cost, including contributions, may exceed the NASA Cost.

4.5 Selection and Cost Limits

It is anticipated that up to four MIDEX investigations will be selected for a four month Phase A concept study through this AO, with each awarded a contract with options for subsequent mission phases. At the conclusion of the concept study, it is planned that two investigations will be selected to proceed into subsequent mission phases. NASA will not exercise contract options nor continue funding for those investigations not selected to proceed.

A concept study will be conducted by each selected investigation team. The cost (up to \$350K, in real year dollars) of the concept study should be part of the initial proposal. See the Guidelines for Concept Study Preparation available in the Explorer Program Library for information on the concept study to be conducted by the investigation team.

During Phase A, the NASA cost shall not increase by more than 20% from that offered in the original proposal and must not exceed the NASA cost cap. Thereafter, cost shall not increase from that offered in the proposal resulting from the Phase A concept study.

Each mission's concept study must conclude with a commitment by the PI for the cost, schedule, and scientific performance of the investigation. If, at any time, the cost, schedule, or scientific performance commitments appear to be in jeopardy, the investigation will be subject to cancellation.

The Explorer program does not maintain a reserve pool from which investigations exceeding their cost commitments may draw.

5.0 MISSIONS OF OPPORTUNITY BACKGROUND, CONSTRAINTS, GUIDELINES, AND REQUIREMENTS

5.1 Missions of Opportunity Background and Constraints

By funding U.S. participation in Missions of Opportunity, NASA seeks to bring the capabilities of the U.S. scientific community to bear on missions conducted as part of a non-NASA space program. Typically, such missions are sponsored by non-U.S. governments, although missions from other U.S. agencies are equally qualified. Mission of Opportunity investigations on a military satellite are allowed as long as the satellite is not planned for weapons testing.

For Missions of Opportunity, the proposer offers to participate in a non-NASA mission that is planned or that has been approved by its sponsoring organization. Such participation could take many forms, such as providing a complete science instrument, hardware components of a science instrument, or expertise in critical areas of the mission. NASA will evaluate the proposed investigation, not the sponsor's entire mission. While the investigator is not required to document the entire mission of the sponsor, the U.S. investigator must fully document their complete investigation in the proposal.

Note that selection by NASA through this AO does not constitute selection of the investigation as part of the mission, which necessarily is a decision made by the sponsor of the mission. Instead, selection is a commitment by NASA to fund the U.S. portion of the investigation as part of the Explorer program, although funding beyond basic studies does not begin until detailed design of the mission itself is underway. If an investigation is selected both by NASA and by the mission sponsor, the PI is responsible to NASA for the scientific integrity and the management of the PI's contribution to the mission.

A selected investigation may result in a contract, a grant, or a cooperative agreement, depending on the nature of the proposal and the institutions involved. For this AO, a deviation is granted by the NASA Office of Procurement that allows a commercial firm to be awarded a grant (with no requirement for NASA involvement in and contribution to the technical aspects of the investigation) provided that the commercial firm contributes at least 50% of the total resources required to accomplish the cooperative agreement. Further information on grants and cooperative agreements is contained in NASA Handbook NPG 5800.1D, entitled, Grant and Cooperative Agreement Handbook, dated July 23, 1996, available from the Explorer Program Library (see Appendix D).

A selected Mission of Opportunity investigation will be expected to submit a concept study report to NASA for detailed review. This report will conclude with a commitment by the PI for the cost, schedule, and scientific performance of the investigation. If, at any time, this commitment appears to be in jeopardy, the investigation will be subject to cancellation. Like other missions proposed to this AO, the NASA funding is subject to cancellation if there is a cost overrun charged to NASA for any reason, including a launch delay caused by the non-NASA partner.

A technical and programmatic review will be held prior to the start of phase C/D. Assuming a positive outcome, NASA will confirm the investigation to proceed to development. As a condition for confirmation, the organization sponsoring the full mission must make a commitment to enter into an appropriate agreement with NASA that shall include provisions for sharing of flight data.

5.2 General Guidelines for Missions of Opportunity

Missions of Opportunity are conducted on a no-exchange-of-funds basis between NASA and the mission sponsor.

5.3 Science Requirements

Mission of Opportunity investigation teams will have data analysis responsibilities defined by the policies of the mission sponsor; nevertheless, NASA expects that the mission sponsor will enter into an agreement with NASA to assure that data returned from at least those aspects of the mission in which NASA support is involved, if not the entire mission, will be made available to the U.S. scientific community in a timely way.

5.4 Cost and Schedule Requirements for Missions of Opportunity

It is incumbent on the proposing investigator to provide evidence in their proposal that the sponsoring organization intends to fund the mission and that the endorsement of NASA for U.S. participation is required by the sponsoring organization prior to December 31, 1999. The launch date is not constrained. If a commitment from NASA is not needed by the sponsoring organization before December 31, 1999, then the proposal should be submitted to a subsequent Explorer program AO.

Although the level of funding available for each proposal will be decided on a case-by-case basis, proposers should be aware that any Mission of Opportunity investigation costing the Explorer program more than \$21 million in fiscal year 1998 dollars will be difficult to support (this includes all phases of the investigation). NASA's funding for a selected investigation's concept study will be limited to \$250K (in real year dollars). Follow-on work prior to selection by the mission's sponsoring organization will be limited to \$100K (in real year dollars), and the limit for all studies prior to the initiation of mission detailed design (Phase C) is 25% of the total NASA commitment for funding of the investigation. The PI assumes all risk for delays in the mission and should propose appropriate reserves.

Proposers must estimate the total NASA Cost in the proposal. The specific cost information required for proposals is contained in Appendix B.

During Phase A, the NASA cost shall not increase by more than 20% from that offered in the original proposal and must not exceed the NASA cost cap. Thereafter, cost shall not increase from that offered in the proposal resulting from the Phase A concept study.

Each mission's concept study must conclude with a commitment by the proposer for the cost, schedule, and scientific performance of the investigation. If, at any time, the cost, schedule, or scientific performance commitments appears to be in jeopardy, the investigation will be subject to cancellation. The Explorer program does not maintain a reserve pool from which investigations exceeding their cost commitments may draw.

6.0 PROPOSAL PREPARATION AND SUBMISSION

6.1 Preproposal Activities

6.1.1 Explorer Program Library

The Explorer Program Library provides additional requirements and background information on the Explorer program, including science goals, technology and education/outreach strategies, and background information on management aspects of flight programs. Information on the Explorer Program Library is contained in Appendix D.

6.1.2 Technical and Scientific Inquiries

Inquiries of a technical nature should be directed to Mr. George Albright, the Explorer Program Executive, at the address below. Inquiries of a scientific nature should be directed to Dr. Paul Hertz, the MDEX Program Scientist, at the address below. Inquiries are preferred in writing and may be

sent by fax or E-mail. The character string "MIDEX AO" (without quotes) should be included in the subject line of all transmissions.

Mr. George Albright
Mission and Payload Development Division
Code SD
National Aeronautics and Space Administration
Washington, DC 20546-0001
Fax Number: 202-358-3987
E-mail: ossao@hq.nasa.gov
Phone: 202-358-0356

Dr. Paul Hertz
Research Program Management Division
Code SR
National Aeronautics and Space Administration
Washington, DC 20546-0001
Fax Number: 202-358-3097
E-mail: paul.hertz@hq.nasa.gov
Phone: 202-358-0351

6.1.3 Preproposal Conference

A preproposal conference will be held in the Washington DC, metropolitan area on May 20, 1998. Further information, including logistics, will be available on the OSS homepage at the World Wide Web address <<http://www.hq.nasa.gov/office/oss/>> prior to the Preproposal Conference. For general information, contact Ms. Angela Robinson of Jorge Scientific Corporation at:

Phone: 202-554-2775
Fax Number: 202-554-3042
E-mail: angela.robinson@hq.nasa.gov

Participants are to attend at their own expense and to make their own travel arrangements. The purpose of this conference will be to address questions about the proposal process for this AO, including a discussion of what NASA considers important in the evaluation of the nonscience criteria (see Section 7.2). The preproposal conference will address all those questions received by NASA on or before May 14, 1998. Questions should be addressed to Mr. Albright at the address above. Additional questions submitted after this date, including those provided in writing at the conference, may be addressed at the conference only as time permits. Anonymity of the authors of all questions will be honored. A MIDEX AO Preproposal Conference Transcript, including answers to all questions addressed at the conference, and minutes of the conference, will be prepared and mailed approximately two weeks after the conference to attendees, to those submitting Notices of Intent (see below), and to anyone who submits a request for this document to Mr. Albright via fax or electronic mail.

6.1.4 Notice of Intent to Propose

To assist NASA's planning of the proposal evaluation process, a Notice of Intent must be submitted by all prospective proposers in accordance with the schedule in Paragraph 1.3. This Notice is to be submitted electronically by entering the requested information on the site at the World Wide Web address<<http://props.oss.hq.nasa.gov>>. Proposers without access to the Web or who experience difficulty in using this site should contact Ms. Debra Tripp (E-mail: deb.tripp@hq.nasa.gov) for assistance.

To the extent the following information is known by the due date, the Notice of Intent should include:

- (a) Names, addresses, telephone numbers, E-mail addresses, and fax numbers of (1) the Principal Investigator; (2) any Co-Investigators; and (3) the lead representative from each organization (industrial, academic, educational, nonprofit, and/or Federal) expected to be included in the proposal team;
- (b) Title of the proposed investigation, a brief statement of the scientific objectives, and the primary NASA science theme (see Section 1.1) that the investigation supports;
- (c) Mission mode (MIDEX or Mission of Opportunity) and launch vehicle;

- (d) Identification of any new technologies that may be employed as part of the mission; and
- (e) A brief statement describing the education/public outreach objectives in the proposed investigation.

SPECIAL NOTICE: As a result of recent AO's for complete mission investigations such as this one, commercial aerospace and technology organizations have requested access to the names and addresses of those who submit NOI's in order to facilitate informing potential proposers of their services and/or products. As an experiment and at the option of the submitters of a NOI, NASA OSS is willing to offer this service with the understanding that the Agency takes no responsibility for the use of such information. Therefore, all those submitting an NOI in response to this AO are requested to include the appropriately edited form of the following material (note: this material is included in the format of the NOI for those submitting electronically via the World Wide Web):

“By submitting this Notice of Intent to propose, I hereby do / do not authorize NASA to post my name and institutional address (but not the name of my intended proposal) as an addendum to this AO on the World Wide Web starting approximately one week after the NOI due date. If I do authorize such a posting, I understand that such information will be in the public domain, and I will not hold NASA responsible for any use made by others for revealing this information.”

Material in a Notice of Intent is for NASA planning purposes only, is confidential, and is not binding on the submitter.

6.2 Format and Content of Proposals

General NASA guidance for proposals is given in Appendix A of this AO and the NASA Grant and Cooperative Agreement Handbook 14 CFR part 1260 (see Appendix D), which is considered binding unless specifically amended in this Section of this AO. A uniform proposal format is required from all proposers to aid in proposal evaluation. The required proposal format and contents are summarized in Appendix B. Failure to follow this outline may result in reduced ratings during the evaluation process or, in extreme cases, could lead to rejection of the proposal without review.

6.3 Submission Information

6.3.1 Certification

The proposal must be signed by an official of the PI's institution authorized to certify institutional support and sponsorship of the investigation, and the management and the financial parts of the proposal. The proposal shall include a letter of endorsement signed by an institutional official from each partner and each organization expecting to provide critical, no-exchange-of-funds contributions of hardware, software, facilities, services, etc., that certifies institutional support and sponsorship of the investigation. Non-U.S. organizations must submit such endorsements to:

Ms. Bettye Jones
Space Science and Aeronautics Division
Code IS
Ref: MIDEX 1998
National Aeronautics and Space Administration
Washington, DC 20546-0001
Phone: 202-358-1664
Fax Number: 202-358-3029

with a copy to:

MIDEX 1998 Support Office
Jorge Scientific Corporation
400 Virginia Avenue, SW, Suite 700
Washington, DC 20024
Fax Number: 202-554-2970

by the due date given in the schedule in Section 1.3. Additional certifications identified in Appendix E are required and must be included with the original, signed proposal.

6.3.2 Quantity

Proposers must provide 40 copies of their proposal, plus the signed original, on or before the proposal deadline given in Section 1.3. One floppy disk with cost data, as described in Appendix B, is required with the original signed proposal.

6.3.3 Submittal Address

All proposals must be received at the following address by the schedule in Section 1.3:

MIDEX 1998 Support Office
Jorge Scientific Corporation
400 Virginia Avenue, SW, Suite 700
Washington, DC 20024

Point of contact for commercial delivery: Ms. Debra Tripp;
Phone: 202-554-2775

Furthermore, one copy (over and above the 40 copies) of any proposal that includes any non-U.S. participants and/or institutional and governmental commitments must be sent to Ms. Bettye Jones at the address listed in Section 6.3.1.

6.3.4 Deadline

All proposals must be received at the address above by the closing date specified in Section 1.3. All proposals received after the closing date will be treated in accordance with NASA's provisions for late proposals (Appendix A, Section V).

6.3.5 Notification of Receipt

NASA will notify the proposers in writing that their proposals have been received. Proposers not receiving this confirmation within two weeks after submittal of their proposals should contact Mr. Albright at the address given in Section 6.1.2.

7.0 PROPOSAL EVALUATION, SELECTION, AND IMPLEMENTATION

7.1 Evaluation, Selection, and Debriefing Processes

All proposals submitted in response to this AO will be subjected to a screening to determine their compliance to the constraints, requirements, and guidelines of the AO. Proposals not in compliance will be returned to the proposer without further review. Proposals in compliance with this AO will be assessed against the criteria given in Section 7.2 by panels of individuals who are peers of the proposers. Panelists will be instructed to evaluate all proposals independently and not to compare larger missions with smaller ones. These panels may be augmented through the solicitation of mail-

in reviews as well, which the panels have the right to accept, in whole or in part, or reject. Proposers should be aware that during the evaluation and selection process, NASA may request clarification of a specific point or points in a proposal. Such a request and the proposer's response shall be in writing.

An *Ad Hoc* Categorization Subcommittee of the Space Science Steering Committee (see below), composed wholly of Civil Servants, will convene to consider the peer review results. This Committee will categorize the proposals in accordance with procedures required by NFS Part 1872.403-1. These Categories are defined as follows:

Category I. Well conceived and scientifically and technically sound investigation pertinent to the goals of the program and the AO's objectives and offered by a competent investigator from an institution capable of supplying the necessary support to ensure that any essential flight hardware or other support can be delivered on time and that data can be properly reduced, analyzed, interpreted, and published in a reasonable time. Investigations in Category I are recommended for acceptance and normally will be displaced only by other Category I investigations.

Category II. Well conceived and scientifically or technically sound investigations which are recommended for acceptance, but at a lower priority than Category I.

Category III. Scientifically or technically sound investigations which require further development.

Category IV. Proposed investigations which are recommended for rejection for the particular opportunity under consideration, whatever the reason.

The results of the evaluations and categorizations will be reviewed by the Space Science Steering Committee (SSSC), which is composed wholly of NASA Civil Servants and appointed by the Associate Administrator for Space Science. The SSSC will conduct an independent assessment of the evaluation and categorization processes regarding both their compliance to established policies and practices as well as their completeness, self-consistency, and adequacy of all materials related thereto. After this review, the final evaluation and categorization results will be forwarded to the Associate Administrator who will make the final selections in consultation with the OSS Science Directors.

In response to this AO, NASA intends to select and fund only Category I investigations for flight.

Category I and Category III investigations are candidates for Explorer new technology funding. NASA may select one or more investigations for further development under the Explorer new technology program. Any investigation selected for Explorer new technology funding will be invited to submit a revised statement of work and a revised budget for a technology development program which addresses developmental shortcomings identified by the MIDEX proposal review panel. The revised statement of work will be reviewed by NASA. In order to be considered for flight opportunities, investigations selected for Explorer new technology funding must repropose to a future Explorer Announcement of Opportunity.

Selected proposers will be notified immediately by phone and then by letter and provided with instructions for initiating their Phase A concept study. Proposers not selected will be notified by letter and will be offered a debriefing. Such debriefings may be in person at NASA Headquarters or, if the investigation team prefers, by telephone. In the former case, NASA funds may not be used to defray travel costs by the proposer for a debriefing. In either case, along with the proposing Principal Investigator, a senior representative from key institution(s) of a proposal may also participate in such debriefings.

7.2 Evaluation Criteria

The evaluation criteria below will be used to evaluate and categorize proposals as described in Section 7.1. For a Mission of Opportunity, the proposed investigation encompasses only the contribution to the mission, not the entire mission.

The evaluation factors (which are defined more fully in subsections below) are listed in descending order of priority:

- The scientific merit of the proposed investigation;
- The technical merit and feasibility of the proposed investigation;
- The feasibility of the proposed approach for mission implementation, including cost risk; and
- The plan for education, outreach, new technology, and small disadvantaged business activities.

7.2.1 Scientific Merit of the Proposed Investigation

To evaluate the intrinsic scientific merit, the goals and objectives of the proposed investigation will be assessed to determine the impact of the investigation on space science as a whole and, in particular, on the U.S. space science program (see goals in Section 2.1). This evaluation will include how well the investigation fills gaps in the understanding of space science and thereby provides for progress in a NASA space science theme (see Section 1.1), and/or how well the proposed investigation may synergistically support other ongoing space science missions sponsored by NASA or a non-U.S. space agency, and whether or not it provides ancillary benefits to the U.S. space science program. Another major element in this assessment will be whether the data that are to be gathered will be sufficient to complete the proposed investigation. For MIDEX investigations, the scientific value of the Minimum Science Mission (see Section 4.2) will also be assessed as part of the determination of the overall scientific merit of the investigation.

7.2.2 Technical Merit and Feasibility of the Proposed Investigation

Each proposed investigation will be evaluated for its technical merit, feasibility, and the probability of success. Technical merit and feasibility will be evaluated by assessing the degree to which the proposed instrument(s) can be built using the proposed technologies and the degree to which the proposed instrument(s) can provide the necessary data, as well as the degree to which the mission will support the accomplishment of acquisition of the required data. Areas requiring critical technology development of the instrument for flight readiness will be identified. Other major elements include the proposed data analysis and archiving plan and the proposed plan for the timely release of the data to the public domain. Should a new technology that represents an untested advance in the state of the art be proposed for use, an assessment will be made of the likelihood of its success. Finally, the probability of success will be evaluated by assessing the experience, expertise, and organizational structure of the science team and the technical risk associated with overall mission design and/or instrument set.

7.2.3 Feasibility of the Proposed Approach for Mission Implementation, including Cost Risk

The technical and management approaches will be evaluated to assess the likelihood that the investigation can be implemented as proposed. This includes an assessment of risk of completing the investigation within the proposed cost. For MIDEX investigations, this will also include an assessment of the likelihood of launching by the proposed launch date. Since it is recognized that teaming arrangements for implementing the mission may not be complete before the proposal closing date, proposers will not be penalized if the proposal indicates only candidate (but credible) implementation approaches for the spacecraft, launch vehicle, communications, and ground systems that should reasonably allow successful implementation of the mission. Mission resiliency (the flexibility to recover from problems) will also be evaluated. For MIDEX missions, this will include an assessment of the approach to descoping the Baseline Science Mission to the Minimum Science Mission in the event that development problems force reductions in scope.

7.2.4 Education, Outreach, New Technology, and Small Disadvantaged Business Activities

The tentative plans for education, outreach, new technology, and small disadvantaged business plans described in the proposal will be rated by evaluating their credibility and the degree to which they propose to meet the program requirements in each of these areas as described in Section 3.3. Specific evaluation criteria for education and public outreach are given in Appendix C.

7.3 Selection Factors

As described in Section 7.1, the results of the proposal evaluations based on the criteria above and categorizations will be considered in the selection process. In addition, the proposed cost to NASA will also be considered in the final selections.

Proposers to this AO should recognize that the program of the Office of Space Science is an evolving activity that critically depends upon Administration policies and budgets, as well as Space Science objectives and priorities, any of which may change quickly. Therefore, it is incumbent upon the Associate Administrator of the Office of Space Science to use all relevant science planning, policy, and cost considerations when making selection(s) among top ranked proposals submitted in response to this AO. In addition, proposers to this AO are advised that it is an objective, but not a requirement, that the final selections reflect a balance among the applicable scientific themes listed in Section 1.1 of this AO.

The overriding consideration for the final selection of proposals submitted in response to this AO will be to maximize scientific return within the available budget. Depending on the availability of proposals of appropriate merit, this objective may be achieved by the selection of at least two investigations each at the cost ceiling for MIDEX investigations, or a larger number of significantly lower cost investigations, or a combination of investigations of various costs.

7.4 Implementation Activities

7.4.1 Notification of Selection

Following selection, the PI's of the selected investigations will be notified immediately by telephone, followed by formal written notification. The formal notification will include any issues noted during the evaluation that may require resolution and any special instructions for the concept study. A Project Initiation Conference will be held as soon as possible after selection to clarify requirements and responsibilities of all parties having roles in the mission, including launch service personnel. Proposers of investigations that were not selected will be notified in writing and offered a debriefing as described in Section 7.1.

7.4.2 Award Administration and Funding

It is anticipated that contracts will be awarded for Phase A concept studies for up to four MIDEX investigations selected as a result of this AO, with options for the follow-on mission phases (Phases B/C/D and E). Any Mission of Opportunity investigations selected under this AO will result in a contract, grant, or cooperative agreement, as described in Section 5.1.

Should a non-U.S. proposal or a U.S. proposal with non-U.S. participation be selected, NASA's International Space Science and Aeronautics Division will arrange with the non-U.S. sponsoring agency for the proposed participation on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency will each bear the cost of discharging their respective responsibilities. Depending on the nature and extent of the proposed cooperation, these arrangements may entail a letter of notification by NASA with a subsequent exchange of letters between NASA and the sponsoring governmental agency or a formal Agency-to-Agency Memorandum of Understanding (MOU).

7.4.3 Downselection of Investigations

As a result of evaluation of the concept studies, NASA expects to downselect to two MIDEX investigations to proceed to subsequent mission phases by exercising contract options of the selected investigations. In no case, however, is NASA required to exercise any option. The downselection decision will be made by the Associate Administrator for Space Science, based upon NASA review of the Phase A concept studies. Proposers should note that definition (Phase B) for the investigation selected as the second mission (launch by June 2004) will proceed at a lower level for a period of time, to conform to the available Explorer program budget profile.

7.4.4 Confirmation of Investigations

During the Phase B/C timeframe, NASA will conduct an independent review of the investigation's readiness to proceed before being authorized to spend more than 25 percent of the total NASA commitment for Phases A/B/C/D. Results of this Confirmation Review and a decision to proceed (or not) will be rendered within 30 days of the review. This decision will be based upon review of the Phase B results, and evidence of satisfactory technical, cost and schedule performance. In addition, for any Mission of Opportunity, a commitment from the organization sponsoring the full mission to enter into an appropriate agreement with NASA is required.

8.0 CONCLUSION

The Explorer program continues to represent a challenging new way for NASA to accomplish important space science exploration as well as to generate opportunities to enhance education initiatives and to engage the public in the excitement of science discoveries. NASA invites both the U.S. and international space science communities to participate in proposals for MIDEX and Missions of Opportunity investigations to be carried out as a result of this Announcement.

Alan N. Bunner
Science Program Director
Structure and Evolution of the Universe

George L. Withbroe
Science Program Director
The Sun-Earth Connection

Edward J. Weiler
Science Program Director
Astronomical Search for Origins

Carl B. Pilcher
Acting Science Program Director
Solar System Exploration

Wesley T. Huntress, Jr.
Associate Administrator
for Space Science

APPENDIX A

GENERAL INSTRUCTIONS AND PROVISIONS

I. INSTRUMENTATION AND/OR GROUND EQUIPMENT

By submitting a proposal, the investigator and institution agree that NASA has the option to accept all or part of the offeror's plan to provide the instrumentation or ground support equipment required for the investigation, or NASA may furnish or obtain such instrumentation or equipment from any other source as determined by the selecting official. In addition, NASA reserves the right to require use of Government instrumentation or property that subsequently becomes available, with or without modification, that meets the investigative objectives.

NOTICE TO ALL OFFERORS: In the event that a Principal Investigator employed by NASA is selected under this Announcement of Opportunity (AO), NASA will award prime contracts to non-Government participants, including co-investigators, hardware fabricators, and service providers, who are named members of the proposing team, as long as the selecting official specifically designates the participant(s) in the selection decision. Refer to Section J of Appendix B of this AO for proposal information which the selecting official will review in determining whether to incorporate a non-Government participant in the selection decision. Each NASA contract with a team member selected in this manner will be supported by an appropriate justification for other than full and open competition, as necessary.

II. TENTATIVE SELECTIONS, PHASED DEVELOPMENT, PARTIAL SELECTIONS, AND PARTICIPATION WITH OTHERS

By submitting a proposal, the investigator and the organization agree that NASA has the option to make a tentative selection pending a successful feasibility or definition effort. NASA has the option to contract in phases for a proposed experiment, and to discontinue the investigative effort at the completion of any phase. NASA may desire to select only a portion of the proposed investigation and/or that the individual participates with other investigators in a joint investigation. In this case, the investigator will be given the opportunity to accept or decline such partial acceptance or participation with other investigators prior to a NASA selection. Where participation with other investigators as a team is agreed to, one of the team members will normally be designated as its leader or contact point. NASA reserves the right not to make an award or cancel this AO at any time.

III. SELECTION WITHOUT DISCUSSION

The Government intends to evaluate proposals and award contracts without discussions with offerors. Therefore, each initial offer should contain the offeror's best terms from a cost or price and technical standpoint. However, the Government reserves the right to conduct discussions, if later determined by the Contracting Officer to be necessary.

IV. NONDOMESTIC PROPOSALS

The guidelines for proposals originating outside of the United States are the same as those for proposals originating within the United States, except that the additional conditions described in Sections 3.7 shall also apply.

V. TREATMENT OF PROPOSAL DATA

It is NASA policy to use information contained in proposals and quotations for evaluation purposes only. While this policy does not require that the proposal or quotation bear a restrictive notice, offerors or quoters should, in order to maximize protection of trade secrets or other information that is commercial or financial and confidential or privileged, place the following notice on the title page

of the proposal or quotation and specify the information, subject to the notice by inserting appropriate identification, such as page numbers, in the notice. In any event, information (data) contained in proposals and quotations will be protected to the extent permitted by law, but NASA assumes no liability for use and disclosure of information not made subject to the notice.

RESTRICTION ON USE AND DISCLOSURE OF PROPOSAL AND QUOTATION INFORMATION (DATA)

The information (data) contained in (insert page numbers or other identification) of this proposal or quotation constitutes a trade secret and/or information that is commercial or financial and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed for other than evaluation purposes; provided, however, that in the event a contract is awarded on the basis of this proposal or quotation, the Government shall have the right to use and disclose this information (data) to the extent provided in the contract. This restriction does not limit the Government's right to use or disclose this information (data), if obtained from another source without restriction.

VI. STATUS OF COST PROPOSALS

Submission of a Standard Form (SF) 1411 Contract Pricing Proposal Cover Sheet for the Phase A concept study is not required. The SF 1411 is required for all contract options after the concept study. The investigator's institution agrees that the cost proposal submitted in response to the Announcement is for proposal evaluation and selection purposes, and that, following selection and during negotiations leading to a definitive contract, the institution may be required to resubmit or execute all certifications and representations required by law and regulation.

VII. LATE PROPOSALS

The Government reserves the right to consider proposals or modifications thereof received after the date indicated for such purpose, if the selecting official deems it to offer NASA a significant technical advantage or cost reduction. (See NFS 18-15.412.)

VIII. SOURCE OF SPACE INVESTIGATIONS

Investigators are advised that candidate investigations for space missions can come from many sources. These sources include those selected through the AO, those generated by NASA in-house research and development, and those derived from contracts and other agreements between NASA and external entities.

IX. DISCLOSURE OF PROPOSALS OUTSIDE THE GOVERNMENT

NASA may find it necessary to obtain proposal evaluation assistance outside the Government. Where NASA determines it is necessary to disclose a proposal outside the Government for evaluation purposes, arrangements will be made with the evaluator for appropriate handling of the proposal information. Therefore, by submitting a proposal, the investigator and institution agree that NASA may have the proposal evaluated outside the Government. If the investigator or institution desires to preclude NASA from using an outside evaluation, the investigator or institution should so indicate on the cover. However, notice is given that if NASA is precluded from using outside evaluation, it may be unable to consider the proposal.

X. EQUAL OPPORTUNITY

For any NASA contract resulting from this solicitation, the clause at FAR 52.222-26, "Equal Opportunity," shall apply.

XI. PATENT RIGHTS

- A. For any NASA contract resulting from this solicitation awarded to other than a small business firm or nonprofit organization, the clause at NFS 18-52.227-70, New Technology, shall apply. Such contractors may, in advance of a contract, request waiver of rights as set forth in the provision at NFS 18-52.227-71, Requests for Waiver of Rights to Inventions.
- B. For any NASA contract resulting from this solicitation awarded to a small business firm or nonprofit organization, the clause at FAR 52.227-11, Patent Rights -- Retention by the Contractor (Short Form), (as modified by NFS 18-52.227-11) shall apply.

XII. RIGHTS IN DATA

Any contract resulting from this solicitation will contain the Rights in Data - General clause: FAR 52.227-14.

XIII. SMALL AND SMALL DISADVANTAGED BUSINESS SUBCONTRACTING

- A. Offerors are advised that, in keeping with Congressionally mandated goals, NASA seeks to place a fair portion of its contract dollars, where feasible, with small disadvantaged business concerns, women-owned small business concerns, Historically Black Colleges and Universities, and minority educational institutions, as these entities are defined in 52.219-8 and in 52.226-2 of the FAR. For this Announcement of Opportunity, NASA has established a recommended goal of 8 percent for the participation of these entities at the prime and subcontract level. This goal is stated as a percentage of the total contract value. NASA encourages all offerors to meet or exceed this goal to the maximum extent practicable and to encourage the development of minority businesses and institutions throughout the contract period. Offerors will be evaluated on the proposed goal for participation of the entities listed above in comparison with the 8 percent goal and on the methods for achieving the proposed goal.
- B. Offerors are advised that for NASA contracts resulting from this solicitation which offer subcontracting possibilities, exceed \$500,000, and are with organizations other than small business concerns, the clause FAR 52.219-9 shall apply. Offerors who are selected under this AO will be required to negotiate subcontracting plans which include subcontracting goals for small, small disadvantaged, and women-owned small business concerns. Note that these specific subcontracting goals differ from the 8 percent goal described in paragraph A above, and need not be submitted with the proposal. Failure to submit and negotiate a subcontracting plan after selection shall make the offeror ineligible for award of a contract.

APPENDIX B

GUIDELINES FOR PROPOSAL PREPARATION

The following guidelines apply to the preparation of proposals in response to this MIDEX and Missions of Opportunity AO. The material presented is a guide for the prospective proposer and is not intended to be all encompassing. The proposer should, however, provide information relative to those items applicable, as well as other items required by the AO. In the event of an apparent conflict between the guidelines in this Appendix and those contained within the body of the AO, those within the AO shall take precedence.

GENERAL GUIDELINES

All documents must be typewritten in English, use metric and standard astronomical units, and be clearly legible. Submission of proposal material by facsimile (fax), electronic media, videotape, or floppy disk (except as noted in Section I, below), is not acceptable. No proposal may reference a World Wide Web site for any data or material for completeness of the proposal.

The proposal must consist of only one volume, with readily identified sections corresponding to Sections C through J given below. Note the restrictions on page count for the various sections specified in the table on page B-2.

In order to allow for recycling of proposals after the review process, all proposals and copies must be submitted on plain white paper only (e.g., no cardboard stock or plastic covers, no colored paper, etc.). Proposers are requested not to use three-ring binders. Photographs and color figures are permitted if printed on recyclable white paper only. The original signed copy (including cover page, certifications, and non-U.S. endorsements) should be bound in a manner that makes it easy to disassemble for reproduction. Except for the original, two-sided copies are preferred. Every side upon which printing appears will be counted against the page limits.

Proposals shall contain no more than 39 pages, with exclusions to the page count noted below, including no more than four fold out pages (28 x 43 cm; i.e., 11 x 17 inches). All pages other than fold out pages shall be 8.5 x 11 inches or A4 European standard.

Single- or double-column format is acceptable. In complying with the page limit, no page should contain more than 55 lines of text and the type font should not be smaller than 12-point (i.e., less than or equal to 15 characters per inch). Figure captions should be in 12 point. Smaller font is allowed within figures and in the cost table.

The following table provides guidance on page count within the proposal:

| Section | Page Limits |
|--|--|
| Fact Sheet | 2 |
| Science Investigation description | 20 |
| Education and Public Outreach, New Technology, and Small Disadvantaged Business Plan | 3 |
| Mission Implementation | 10 |
| Management, Schedule, and Cost Estimating Methodology | 4 |
| Appendices: (no others permitted) Resumes (1 page) Letter(s) of Endorsement Statement(s) of Work (SOW) NASA PI Proposing teams (1 page) Reference List (optional) Acronyms List (optional) | No page limit, but small size encouraged |

The content of each proposal is described below. Note that the term “spacecraft” as used in this Appendix includes Space Shuttle carriers.

A. INVESTIGATION SUMMARY

A summary of the proposed investigation must be included with the proposal. The Investigation Summary does not count against the page limit. The form to be used for this Summary is located at the World Wide Web address <<http://props.oss.hq.nasa.gov>>. Proposers who experience difficulty in using this Web format should contact Debra Tripp (E-mail: deb.tripp@hq.nasa.gov) for assistance. A hard copy printout of the completed Investigation Summary must be included with each copy of the proposal. It is NASA’s intent to enter the Summaries of all selected investigations for its various programs into a publicly accessible data base. Therefore, the Investigation Summary should not contain any proprietary or confidential information that the submitter wishes to protect from public disclosure.

B. COVER PAGE

A cover page must be a part of the proposal, but will not be counted against the page limit. It must be signed by the Principal Investigator and an official by title of the investigator's organization who is authorized to commit the organization. The full names of the Principal Investigator and the authorizing official, their addresses with zip code, telephone and fax numbers, and electronic mail addresses, shall be included.

C. FACT SHEET

A Fact Sheet that provides a brief summary of the proposed investigation must be included in the proposal. The information conveyed on the Fact Sheet should include the following: science objectives (including the importance of the science to the NASA science themes), mission overview (including mission objectives and major mission characteristics), science payload, key spacecraft characteristics, anticipated launch vehicle, mission management (including teaming arrangement as known), schedule, and cost estimate. Other relevant information, including figures or drawings, may be included at the proposer’s discretion. The Fact Sheet is restricted to two pages (preferably a double-sided single sheet).

D. TABLE OF CONTENTS

The proposal should contain a table of contents, which will not be counted against the page limit. This table of contents should parallel the outlines provided below in Sections E through J.

E. SCIENCE

The science section should describe the scientific objectives of the proposed investigation, including the value of the investigation to the space science themes. The primary science theme to which the investigation applies should be identified. A discussion of the scientific products and how the science products and data obtained will be used to fulfill the scientific objectives should be provided. A discussion of how the science data will be obtained, including a plan for delivery of the products, and the individuals responsible for the data delivery, should also be provided.

1. Scientific Goals and Objectives. This section should consist of a discussion of the goals and objectives of the investigation; their value to the primary and any secondary science themes; and their relationships to past, current, and future investigations and missions. It should describe the history and basis for the proposal and discuss the need for such an investigation. An overview of the mission should be provided.

The measurements to be taken in the course of the mission, the data to be returned, and the approach that will be taken in analyzing the data to achieve the scientific objectives of the investigation should be discussed. This description should identify the investigation to be performed, the quality of the data to be returned (resolution, coverage, pointing accuracy, measurement precision, etc.), and the quantity of data to be returned (bits, images, etc.). The relationship between the data products generated and the scientific objectives should be explicitly described, as should the expected results. It is assumed that the above information will constitute the Baseline Mission.

This section must also identify a minimum acceptable data and scientific return for the mission (the Minimum Science Mission), below which the mission would not be worth pursuing. The value of the Minimum Science Mission should be discussed. A description of the descope options available, their phasing, and their effect on meeting the scientific objectives of the mission, as the mission is descope from the Baseline to the Minimum Science Mission should be discussed. Proposals should include only one Baseline mission and one Minimum Science Mission.

2. Science Implementation.

- a. Instrumentation. This section should describe the instrumentation and the criteria used for its selection. It should identify the individual instruments and instrument systems, including their characteristics and requirements. It should indicate items that are proposed to be developed, as well as any existing instrumentation or design/flight heritage.

A preliminary description of each instrument design with a block diagram showing the instrument systems and their interfaces should be included, along with a description of the estimated performance of the instrument. Performance characteristics should be related to the measurement and investigation objectives as stated in the proposal. Such characteristics include a discussion of the data rates, fields of view, resolution, precision/sensitivity, pointing accuracy, etc.

- b. Mission. Mission observing strategy and spacecraft performance required for obtaining the necessary data with the proposed instrumentation must be described. The concept for operating the mission and the requirements for mission operations must be given.
- c. Data Analysis and Archiving. The data reduction and analysis plan, after the data have been delivered to the ground, should be discussed, including the method and format of the data reduction, data validation, and preliminary analysis. The process by which data will be prepared for archiving should be discussed, including a list of the specific data products and the individual team members responsible for the data products. The plan must include a detailed schedule for the submission of raw and reduced data to the appropriate

NASA data archive in the proper formats, media, etc. Delivery of the data to the data archive must take place in the shortest time possible.

- d. Science Team. This section must identify the investigation science team and their roles and responsibilities. The capabilities and experience of all members of the proposed science team should be described. Resumes or curriculum vitae of team members should be included as attachments to the proposal (see Section I, below). The role of each science team member in the investigation should be explicitly defined and justified.

F. EDUCATION, OUTREACH, NEW TECHNOLOGY, AND SMALL DISADVANTAGED BUSINESS PLAN

The education, public outreach, new technology, and small disadvantaged business section shall provide a summary of the benefits offered by the mission beyond the scientific benefits. This plan should reflect the proposer's commitment to achieving the goals of the OSS education and public outreach strategy as reflected in the Implementation Plan for that strategy, participation of small disadvantaged business, and the use of new technology in the implementation of the investigations. Further information on the OSS' broad approach to education and outreach can be found in Implementing the Office of Space Science (OSS) Education and Outreach Strategy (see contents of the Explorer Program Library, Appendix D). Guidance on the use of new technology in investigations can be found in the OSS Integrated Technology Strategy in the Explorer Program Library.

G. MISSION IMPLEMENTATION

This section should provide a description of the mission, including mission design, instrument accommodation, spacecraft, launch vehicle required, ground systems, communications approach, and mission operations plan. Specific information should be included that describes the unique requirements placed on these mission elements by the science investigation. If the Space Shuttle is proposed as the launch vehicle, the proposal must state whether the investigation is considered a primary or a secondary payload, specify the target flight assignment, and provide justification for Shuttle use as required by Public Law 101-611 (see the Shuttle Launch Opportunities document in the Explorer Program Library (Appendix D).

As part of this section, describe your development approach which will assure mission success. Include the following items in your discussion to the degree known:

- Heritage and maturity of mission elements (spacecraft, ground systems, and mission design, etc.)
- Approach to use or non-use of redundancy and other reliability measures requirements for burn-in of parts and total operating time required without failure prior to flight
- Assembly, integration and test flows and integration and test approach
- Environmental test philosophy (test flow and sequence, test margins and test durations)
- Product assurance activities
- Systems engineering and trade studies to be conducted
- Potential risks to the proposed investigation and plans for mitigating those risks
- Technology development plans and back-up plans if technologies do not meet development needs (new technology may be penalized for risk if adequate back-up plans are not described to ensure success of the investigation).

It is recognized that teaming arrangements to implement the investigation may not be complete at the time of the proposal. Proposers will not be penalized for this if it is demonstrated that there are candidate implementation approaches for the spacecraft, launch vehicle, communications, and ground systems that will allow the successful implementation of the investigation.

In addition to the information above, the specific data identified below should be provided (in tables) as known and as applicable to the mission configuration proposed.

1. General information.

Launch date (including launch date flexibility), mission duration, orbit type (Earth orbit, heliocentric, etc.), orbit information (semimajor axis, eccentricity, inclination, node time of day, argument of perigee, altitude).

2. Downlink Information.

Data volume (Mbytes/day), bit error rate, onboard storage (Mbytes), power available for communications (watts), number of data dumps per day, spacecraft data destination (e.g., mission operations center), science data destination (e.g., science operations center), maximum time lag between data dump and data arrival at destination, if relevant to science needs.

3. Uplink Information.

Number of uplinks per day, number of Bytes per uplink, bit error rate, approach and schedule for obtaining license(s) for use of proposed frequency bands.

4. Resources and Margins.

For satellite (instrument package and spacecraft), provide estimates for mass, power, and reserves at the subsystem level (including propellant), and margins at the system level. For instrument package requirements on the spacecraft, provide pointing, stability, attitude, and maneuvering requirements necessary for science operations (include design margins, when known).

Definitions:

Contingency (or reserve) when added to a resource, results in the maximum expected value for that resource. Percent contingency is the value of the contingency divided by the value of the resource less the contingency.

Margin is the difference between the maximum possible value of a resource (the physical limit or the agreed-to limit) and the maximum expected value for a resource. Percent margin for a resource is the available margin divided by its maximum expected value.

Example: A payload in the design phase has an estimated mass of 115 kg including a mass reserve of 15 kg. There is no other payload on the ELV and the ELV provider plans to allot to you the full capability of the vehicle, if needed. The ELV capability is 200 kg. The mass reserve is $15/100 = 15\%$ and the mass margin is 85 kg or $85/115 = 74\%$.

Example: The end-of-mission life capability of a spacecraft power system is 200 watts. Your instrument is expected to use 50 watts, including 25% contingency. You are allotted 75 watts by the satellite provider. Your reserve is 10 watts and your margin is 25 watts, or $25/50 = 50\%$.

5. Attitude and Control Requirements

Control method (3-axis, spinner, gravity gradient, etc.)

Control reference (solar, inertial, Earth-nadir, Earth-limb, etc.)

Attitude control requirements for bias, drift, stability or jitter, rate for scanning (each axis)

Spacecraft attitude knowledge requirements at the instrument interface for bias, drift, jitter, rate for scanning (each axis)

Agility (maneuvers, scanning, etc.)

Deployments (solar panel, antennas, etc.)

Articulation (1,2 -axis solar arrays, antennas, gimbals, etc.)
On-orbit calibration (alignment, line-of-sight, thermal deformation)
Attitude knowledge processing: real-time versus postprocessing, spaceborne versus ground

6. Instrument Characteristics

Bias, drift, and noise of instrument data used in pointing control and knowledge determination. Character of significant instrument-generated jitter and momentum.

7. Spacecraft Characteristics

Number, type and redundancy of the attitude and control system sensors and actuators. A block diagram of the spacecraft system components.

For Missions of Opportunity, provide the information above that is related to the proposed investigation's requirements on and interfaces with the sponsor's instrument/spacecraft.

H. MANAGEMENT AND SCHEDULE

This section should summarize the investigator's proposed management approach. The management organization (including an organization chart) and decision-making process should be described, and the teaming arrangement (as known) should be discussed. The responsibilities of team members, including contributors, and institutional commitments should be discussed. Unique capabilities that each team member organization brings to the team, as well as previous experience with similar systems and equipment, should be addressed. The specific roles and responsibilities of the Principal Investigator and Project Manager must be described, but key project personnel (e.g., the Project Manager) need not be identified by name at this time. Risk management and risk mitigation plans must be described. This discussion should include the top 3-5 risks, descoping strategies, if relevant, and management strategies for control, allocation and release of technical, cost and schedule reserves and margins. When contracts are required, the acquisition strategy including any incentive strategy should be described.

A project schedule to meet the proposed launch date and covering all phases of the investigation should be provided. The schedule should include, as a minimum, proposed major project review dates, instrument development, spacecraft development; instrument-to-spacecraft integration and test, launch vehicle integration, and mission operations and data analysis. Schedule reserve should be clearly identified.

Mission of Opportunity proposals should specifically address how the investigation team will interrelate with the sponsoring organization, organizationally and managerially. Mission of Opportunity proposals should also describe:

- The status of the commitment from the spacecraft builder/owner or sponsoring organization to fly the proposed instrument or conduct the proposed investigation.
- If and how the proposed investigation relates to the spacecraft sponsor's overall mission objectives.
- The investigation development plan and how it fits in the development plan for the sponsor's mission.
- How the operations plan for the proposed investigation fits within the mission of the sponsoring organization.

I. COST AND COST ESTIMATING METHODOLOGY

This section shall include an estimated cost of the investigation that encompasses all proposed activities, including all applicable mission phases, launch services, development of the ground data system, fee, and contributions. These costs shall be consistent with the program requirements described in Section 3, 4, and 5 of the AO. The amount required in each fiscal year should be identified by providing the data in Table B1 for MIDEX missions and Table B2 for Missions of Opportunity, which will not be counted against the page limit. The top portion of

Table B1 and B2 requests cost data relative to the NASA Cost. The lower portion addresses contributions. Table B3 gives the NASA inflation index to be used to calculate real year dollars.

Proposers are also requested to submit the data in Table B1 or B2, as appropriate, on a floppy disk with their original, signed proposal. The disk may be either IBM-compatible or Macintosh-compatible and the cost data, including the headings for the rows and columns, should be in tab-delimited text files. The disk should be labeled with the title of the proposal and the PI's name.

The methodology used to estimate the cost, for example, specific cost model, past performance, cost estimating relationships from analogous missions, should be discussed. Budget reserve strategy, including budget reserve levels as a function of mission phase, should be discussed. Please provide assumptions used in developing cost estimates to help facilitate reviewer understanding of proposed cost estimates.

J. APPENDICES

The following additional information is required to be supplied with the proposal as Appendices and, as such, will not be counted within the specified page limit. NO OTHER APPENDICES ARE PERMITTED.

1. Statement of Work (SOW) and Funding Information. For investigations managed from non-Government institutions, provide a SOW. For investigations managed from Government institutions, provide a SOW as if the institution were non-Government. This SOW must include the requirement for a Phase A concept study report that is described in the Guidelines for Concept Study Report document available through the Explorer Program Library. The SOW must include general tasks statements for Phases B/C/D and for Phase E for MDEX investigations and Missions of Opportunity. All SOW's should include the following as a minimum: Scope of Work, Deliverables (including science data), and Government Responsibilities (as applicable). SOW's need not be more than a few pages in length. If more than one contractual arrangement between NASA and the proposing team is required, funding information must be provided which identifies how funds are to be allocated among the organizations.
2. Letters of Endorsement. Letters of endorsement must be provided from all organizations offering goods and/or services on a no-exchange-of-funds basis, non-U.S. organizations providing hardware or software to the investigation, and the Launch Service provider if the launch service is not provided through a NASA contract. Letters of endorsement should be signed by institutional and/or Government officials authorized to commit their organizations to participation in the proposed investigation.
3. Resumes. Provide resumes or curriculum vitae for all science team members identified in the science section and for any key project personnel. The resume should clearly show experience related to the job the individual will perform on the proposed investigation. Resumes or curriculum vitae should be no longer than one page for each participant.
4. NASA Principal Investigator Proposing Teams. Proposals submitted by NASA employees as Principal Investigators should contain the following information concerning the process by which non-Government participants were included in the proposal. The proposal should (i) indicate that the supplies or services of the proposed non-Government participant(s) are available under an existing NASA contract; (ii) make it clear that the capabilities, products, or services of these participant(s) are sufficiently unique to justify a sole source acquisition; or (iii) describe the open process that was used for selecting proposed team members. While a formal solicitation is not required, the process cited in (iii) above should include at least the following competitive aspects: notice of the opportunity to participate to potential sources; submissions from and/or discussions with potential sources; and objective criteria for selecting team members among interested sources. The proposal should address how the selection of

the proposed team members followed the objective criteria and is reasonable from both a technical and cost standpoint. The proposal should also include a representation that the Principal Investigator has examined his/her financial interests in or concerning the proposed team members and has determined that no personal conflict of interest exists. The proposal must provide a certification by a NASA official superior to the Principal Investigator verifying the process for selecting contractors as proposed team members, including the absence of conflicts of interest.

The following information may be provided.

1. References List. Proposals may provide, as an appendix, a list of reference documents and materials used in the proposal. The documents and materials themselves cannot be submitted, except as a part of the proposal and included within the prescribed page count.
2. Acronyms List.

TABLE B1
TOTAL MISSION COST FUNDING PROFILE TEMPLATE
FOR MIDEX
(FY costs* in Real Year Dollars, Totals in Real Year and 1998 Dollars)

| Item | FY1 | FY2 | FY3 | FY4 | FY5 | ... | FYn | Total (Real Yr.) | Total (FY 1998) |
|------------------------|-----|-----|-----|-----|-----|-----|-----|------------------------|-----------------------|
| NASA Cost | | | | | | | | | |
| Concept Study | | | | | | | | | |
| Ground Data System Dev | | | | | | | | | |
| Science | | | | | | | | | |
| Instrument A | | | | | | | | | |
| Instrument B | | | | | | | | | |
| Spacecraft | | | | | | | | | |
| MSI&T ** | | | | | | | | | |
| Launch services | | | | | | | | | |
| MO&DA *** | | | | | | | | | |
| Ed/Outreach | | | | | | | | | |
| Other (specify) | | | | | | | | | |
| Total NASA Cost | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Contributions | | | | | | | | | |
| Concept Study | | | | | | | | | |
| Ground Data System Dev | | | | | | | | | |
| Science | | | | | | | | | |
| Instrument A | | | | | | | | | |
| Instrument B | | | | | | | | | |
| Spacecraft | | | | | | | | | |
| MSI&T** | | | | | | | | | |
| Launch Services | | | | | | | | | |
| MO&DA | | | | | | | | | |
| Other | | | | | | | | | |
| Total Contributions | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Total Mission Cost | | | | | | | | \$ | |

* Costs should include all costs including any fee

** MSI&T - Mission System Integration and Test and preparation for operations

*** Mission Operations and Data Analysis

TABLE B2

NASA COST FUNDING PROFILE TEMPLATE
FOR MISSIONS OF OPPORTUNITY
(FY costs* in Real Year Dollars, Totals in Real Year and 1998 Dollars)

| Item | FY1 | FY2 | FY3 | FY4 | FY5 | ... | FYn | Total (Real Yr.) | Total (FY 1998) |
|------------------------|-----|-----|-----|-----|-----|-----|-----|---------------------|--------------------|
| Concept Study | | | | | | | | | |
| Ground Data System Dev | | | | | | | | | |
| Science | | | | | | | | | |
| Instrument A | | | | | | | | | |
| Instrument B | | | | | | | | | |
| MO&DA** | | | | | | | | | |
| Ed/Outreach | | | | | | | | | |
| Other (specify) | | | | | | | | | |
| Total NASA Cost | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ |

* Costs should include all costs including any fee

** Mission Operations and Data Analysis

TABLE B3

NASA NEW START INFLATION INDEX

| Fiscal Year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|----------------------------|------|-------|-------|-------|-------|-------|-------|-------|
| Inflation Rate | 0.0% | 3.8% | 4.1% | 3.9% | 3.9% | 3.9% | 3.9% | 3.9% |
| Cumulative Inflation Index | 1.0 | 1.038 | 1.081 | 1.123 | 1.166 | 1.212 | 1.259 | 1.308 |

Use an inflation rate of 3.9% for years beyond 2005.

APPENDIX C

EDUCATION/PUBLIC OUTREACH EVALUATION CRITERIA AND PROPOSAL PREPARATION ASSISTANCE

Education and Public Outreach Plan Evaluation Criteria

In order to ensure that the goals and objectives of the OSS education and public outreach (E/PO) strategy are realized in practice, proposals will be evaluated using the following specific criteria:

- The establishment of effective, long-duration partnerships with institutions and/or personnel in the fields of educational and/or public outreach as the basis for and an integral element of the proposed E/PO program;
- The potential of the proposed E/PO activity to have a “multiplier effect” (e.g., prospects for broad dissemination or replication of an E/PO product);
- For proposals dealing with the formal education system, the degree to which the proposed E/PO effort promotes nationally recognized and endorsed education reform efforts and/or reform efforts at the state or local levels;
- The degree to which the proposed E/PO effort contributes to the training of, involvement in, and broad understanding of science and technology by underserved and/or underutilized groups; and
- The prospects for building on, taking advantage of, and leveraging existing and/or ancillary resources beyond those directly requested in the proposal;

It is recognized that not all proposals can (or even should) address all of these factors and only the relevant subset will be considered in evaluating each individual proposal. In addition, the following general criteria also will be considered in evaluating all proposals:

- The quality, scope, and realism of the proposed E/PO program;
- The capability and commitment of the proposer to carry out the proposed E/PO program;
- The adequacy of plans for evaluating the effectiveness and impact of the proposed education/outreach activity;
- The linkage of the proposed E/PO task with existing NASA science and/or education programs and activities; and
- The adequacy and realism of the proposed budget (including any additional resources outside those requested from NASA).

Note that originality of the proposed effort is not a criterion. Rather, NASA OSS seeks assurance that the PI is personally committed to carrying out a meaningful, effective, credible, and appropriate E/PO activity; that such an activity has been planned and will be executed; and that the proposed investment of resources will make a significant contribution toward meeting OSS E/PO goals and objectives. Additional guidance is contained in the OSS E/PO strategy and implementation plans referenced in section 3.3.1 and Appendix D.

The E/PO component of proposals will be evaluated by appropriate scientific and professional education and outreach personnel, and the results of that evaluation will be factored into the overall evaluation of the proposal and the selection process as outlined in Section 7.

Assistance for the Preparation of Education and Public Outreach Proposals

To directly aid space science personnel in identifying and developing high quality E/PO opportunities and establishing partnerships between the space science and E/PO communities, NASA OSS has established a national space science education/outreach infrastructure. The purpose of this infrastructure is to provide the coordination, background, linkages, and services needed for a vital national, coordinated, long-term E/PO program.

Of particular interest to proposers to this AO are two elements of this system (which is described in more detail in the OSS education/outreach implementation plan referenced earlier):

- (i) Four OSS science theme oriented “E/PO Forums” have been established to help orchestrate and organize in a comprehensive way the education/outreach aspects of OSS space science missions and research programs and provide ready access to relevant E/PO programs and products to both space science and education communities.
- (ii) Five regional E/PO “Broker/Facilitators” have also been selected to search out and establish high leverage opportunities, arrange alliances between educators and OSS-supported scientists, and help scientists turn results from space science missions and programs into educationally-appropriate activities to be disseminated regionally and nationally.

Prospective proposers are strongly encouraged to make use of these infrastructure resources to help identify suitable E/PO opportunities and arrange appropriate alliances. Points of contact and addresses for all of these E/PO Forums and Broker/Facilitators may be found by selecting “Education and Public Outreach” from the menu of the OSS homepage at World Wide Web address <<http://www.hq.nasa.gov/office/oss/>>.

APPENDIX D

CONTENTS OF THE EXPLORER PROGRAM LIBRARY

The Explorer Program Library includes documents available electronically via the Internet, as well as paper copy. Proposers are requested to access the document electronically where possible. Only limited paper copies of documents are available. Please note that not all documents are available via the Explorer Program Library, but access information is provided.

It is incumbent upon the proposer to ensure that the documents used in proposal preparation are of the date and revision listed in the Announcement of Opportunity or this Appendix.

The Explorer Program Library is accessible on the World Wide Web at the World Wide Web address <<http://explorer.larc.nasa.gov/explorer/epl.html>>.

Requests for paper copies should be submitted in writing to:

Explorer Program Library
Mail Stop 160
Langley Research Center
National Aeronautics and Space Administration
Hampton, VA 23681-0001
Fax Number: (757) 864-8894
E-mail: j.a.lintott@larc.nasa.gov

Office of Space Science Strategies and Policies

The Space Science Enterprise Strategic Plan: Origins, Evolution, and Destiny of the Cosmos and Life (November 1997)

This document is a concise statement of the goals and outlook of NASA's Space Science Enterprise. It is a compilation of the major ideas described in more detail in the context of the overall NASA Strategic Plan.

Partners in Education: A Strategy for Integrating Education and Public Outreach into NASA's Space Science Programs (March 1995)

This document describes the overall strategy for integrating education and public outreach into NASA's space science programs.

Implementing the Office of Space Science (OSS) Education/Public Outreach Strategy (October 1996)

This document describes OSS's overall approach to implementing its Education/Public Outreach strategy.

OSS Integrated Technology Strategy (April 1994)

Describes efforts to manage technology infusion into future OSS missions and to promote technology transfer to the private sector.

Space Science Roadmaps

The science themes of the NASA Office of Space Science, through the Space Science Advisory Committee and its subcommittees, have developed Roadmaps. These planning documents prioritize the space science goals for NASA for the years 2000-2020. The following Roadmaps apply to the Explorer program:

Sun-Earth Connection Roadmap, Strategic Planning for the Years 2000 - 2020 (April 1997)

The Evolving Universe, Structure and Evolution of the Universe Roadmap 2000 - 2020
(April 1997)

Search for Origins Roadmap (April 1997)

A paper copy may be obtained by sending an E-mail with name and address to <hthronson@hq.nasa.gov>.

Space Science Supporting Documents

A Science Strategy for Space Physics (1995)

National Research Council report. A paper copy may be obtained by sending an E-mail with name and address to <cchamber@nas.edu>.

NAS/NAC Report: A New Science Strategy for Space Astronomy and Astrophysics (1997)

Report of the Task Group on Astronomy and Astrophysics. A study undertaken by the Space Science Board to determine the principal scientific issues that the discipline of space science would face during the period 1995-2015.

HST and Beyond. Exploration and Search for Origins: A Vision for Ultraviolet - Optical - Infrared Space Astronomy (May 1996)

Report of the "HST and Beyond Committee."

Exploration of Neighboring Planetary Systems (ExNPS) Study (August 1996)

Jet Propulsion Laboratory report. Mission and technology road map; presentation to the Townes Blue Ribbon Panel.

Recommended Priorities for NASA's Gamma-Ray Astronomy Program 1996-2010 (1997)

Report synopsis of the Gamma Ray Astronomy Program Working Group.

15-Year Plan for X-Ray Astronomy 1994 - 2008 (June 1994)

Report of the X-Ray Astronomy Program Working Group. A paper copy may be obtained by sending an E-mail with name and address to <phertz@hq.nasa.gov>.

NAS/NRC Report: Opportunities in Cosmic-Ray Physics and Astrophysics (1995)

Report of the Committee on Cosmic-ray Physics. A review was undertaken by the Board on Physics and Astronomy to review the field that addresses both experimental and theoretical aspects of the origin of cosmic radiation from outside the heliosphere.

NAS/NRC Report: Cosmology, A Research Briefing (1995)

Report of the Panel on Cosmology. A research briefing by the Board on Physics and Astronomy to reassess the opportunities for scientific advances in cosmology.

MIDEX Guidelines and Requirements Documents

MIDEX Ground Data Systems and Mission Operations and Data Analysis

Describes the functions and costs of Ground Data Systems and Mission Operations and Data Analysis.

MIDEX Safety, Reliability, and Quality Assurance Requirements

Describes the responsibilities of the PI with regard to Safety, Reliability, and Quality Assurance.

MIDEX Space Shuttle Launch Opportunities

Provides information and points of contact for proposers interested in launching a payload on the Space Shuttle. Information on the GSFC-provided Spartan carrier is included.

MIDEX Expendable Launch Vehicle Opportunities

Provides information on opportunities to propose a mission on an expendable launch vehicle.

MIDEX - Sample Terms and Conditions for the Phase A (Concept Study) Contract

MIDEX Guidelines for Concept Study Preparation

Describes the requirements for preparation of the concept study report.

General Guideline and Requirements Documents

Example Mission Definition and Requirements Agreement

Example of such an agreement.

NHB 7120.5 -- Management of Major System Programs and Projects (November 1993)

This NASA Handbook provides a reference for typical activities, milestones, and products in the development and execution of NASA missions.

ISO 9000 Series

The following ISO 9000 quality documents describe current national and NASA standards of quality processes and procedures.

American National Standard, "Quality Systems - Model for Quality Assurance in Design, Development, Production, Installation, and Servicing," ANSI/ASQC Q9001-1994.

"Quality Management and Quality System Elements - Guidelines," ANSI/ASQC Q9004-1-1994.

"Quality Management and Quality Assurance Standards - Guidelines for Selection and Use," ANSI/ASQC Q9000-1-1994

"ISO 9000 and NASA," Code Q presentation, April 24, 1995.

Note: The first three ISO 9000-related documents are copyrighted and cannot be reproduced without appropriate compensation. For copies contact:

American Society for Quality Control (ASQC)
P.O. Box 3066
Milwaukee, WI 53201-3066
800-248-1946

Explorer Program Background

Assessment of Recent Changes in the Explorer Program (December 1996)

Report by the Space Studies Board of the National Research Council. A paper copy may be obtained from:

Space Studies Board
National Research Council
2101 Constitution Avenue, NW
Washington, DC 20418

MIDEX Lessons-Learned Workshop Report (August 1996)

Proceedings from the Medium-class Explorer (MIDEX) Lessons-Learned Workshop held in June 1996.

Procurement-related Information

Electronic versions only are available for the following:

Federal Acquisition Regulations (FAR) General Services Administration

(URL: <http://www.arnet.gov/far/>)

NASA FAR Supplement Regulations

(URL: <http://www.hq.nasa.gov/office/procurement/regs/nfstoc.htm>)

NASA Financial Management Manual

(URL: <http://www.hq.nasa.gov/fmm/>)

NPG 5800.1D -- Grant and Cooperative Agreement Handbook (July 1996)

(URL: <http://procure.msfc.nasa.gov/grcover.htm>)

APPENDIX E

REGULATIONS GOVERNING PROCUREMENT OF FOREIGN GOODS OR SERVICES

The following Federal Acquisition Regulation (FAR) clauses cover the purchase of foreign goods and services and may be included in contracts resulting from this Announcement of Opportunity:

| | |
|-----------|--|
| 52.225-3 | Buy American Act -- Supplies (January 1994) |
| 52.225-7 | Balance of Payments Program (April 1984) |
| 52.225-9 | Buy American Act -- Trade Agreements -- Balance of Payments Program (January 1994) |
| 52.225-10 | Duty-Free Entry (April 1984) |
| 52.225-11 | Restrictions on Certain Foreign Purchases (May 1992) |
| 52.225-17 | Buy American Act -- Supplies Under European Community Agreement (May 1995) |
| 52.225-18 | European Community Sanction for End Products (May 1995) |
| 52.225-19 | European Community Sanction for Services (May 1995) |
| 52.225-21 | Buy American Act -- North American Free Trade Agreement Implementation Act -- Balance of Payments Program (January 1994) |

The proposer is directed to the Federal Acquisition Regulation and the NASA FAR Supplement for further information on these regulations. Access information for these documents is given in the Explorer Program Library (see Appendix D).

APPENDIX F

CERTIFICATIONS

CERTIFICATION REGARDING DRUG-FREE WORKPLACE REQUIREMENTS

This certification is required by the regulations implementing the Drug-Free Workplace Act of 1988, 34 CFR Part 85. Subpart F. The regulations, published in the January 31, 1989 Federal Register, require certification by grantees, prior to award, that they will maintain a drug-free workplace. The certification set out below is a material representation of fact upon which reliance will be placed when the agency determines to award the grant. False certification or violation of the certification shall be grounds for suspension of payments, suspension or termination of grants, or government-wide suspension or debarment (see 34 CFR Part 85, Sections 85.615 and 85.620).

I. GRANTEES OTHER THAN INDIVIDUALS

A. The grantee certifies that it will provide a drug-free workplace by:

- (a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;
- (b) Establishing a drug-free awareness program to inform employees about --
 - (1) The dangers of drug abuse in the workplace;
 - (2) The grantee's policy of maintaining a drug-free workplace;
 - (3) Any available drug counseling, rehabilitation, and employee assistance programs; and
 - (4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;
- (c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);
- (d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will
 - (1) Abide by the terms of the statement; and
 - (2) Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after such conviction;
- (e) Notifying the agency within ten days after receiving notice under subparagraph (d) (2) from an employee or otherwise receiving actual notice of such conviction;
- (f) Taking one of the following actions, within 30 days of receiving notice under subparagraph (d) (2), with respect to any employee who is so convicted --
 - (1) Taking appropriate personnel action against such an employee, up to and including termination; or
 - (2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or Local health, Law enforcement, or other appropriate agency;
- (g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e), and (f)

B. The grantee shall insert in the space provided below the site(s) for the performance or work done in connection with the specific grant:

Place of Performance (Street address, city, county, state, zip code)

Check ☐ if there are workplaces on file that are not identified here.

II. GRANTEES WHO ARE INDIVIDUALS

The grantee certifies that, as a condition of the grant, he or she will not engage in the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance in conducting any activity with the grant.

Organization Name

AO or NRA Number and Title

Printed Name and Title of Authorized Representative

Signature

Date

Printed Principal Investigator Name

Proposal Title

CERTIFICATION REGARDING
DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS
PRIMARY COVERED TRANSACTIONS

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 14 CFR Part 1265.

A. The applicant certifies that it and its principals:

- (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- (b) Have not within a three-year period preceding this application been convicted or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or Local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- (c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, or Local) with commission of any of the offenses enumerated in paragraph A.(b) of this certification;
- (d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or Local) terminated for cause or default; and

B. Where the applicant is unable to certify to any of the statements in this certification, he or she shall attach an explanation to this application.

C. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lowered Tier Covered Transactions (Subgrants or Subcontracts)

- (a) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principles is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department of agency.
- (b) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Organization Name

AO or NRA Number and Title

Printed Name and Title of Authorized Representative

Signature

Date

Printed Principal Investigator Name

Proposal Title

CERTIFICATION REGARDING
LOBBYING

As required by S 1352 Title 31 of the U.S. Code for persons entering into a grant or cooperative agreement over \$100,000, the applicant certifies that:

- (a) No Federal appropriated funds have been paid or will be paid by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, in connection with making of any Federal grant, the entering into of any cooperative, and the extension, continuation, renewal, amendment, or modification of any Federal grant or cooperative agreement;
- (b) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting an officer or employee of any agency, Member of Congress, or an employee of a Member of Congress in connection with this Federal grant or cooperative agreement, the undersigned shall complete Standard Form - LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (c) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subgrants, contracts under grants and cooperative agreements, and subcontracts), and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by S1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Organization Name

AO or NRA Number and Title

Printed Name and Title of Authorized Representative

Signature

Date

Printed Principal Investigator Name

Proposal Title